

10007457-1

AMENDMENTS TO THE CLAIMS

In accordance with the PTO's revised amendment format, a detailed
5 listing of all claims has been provided. A status identifier is provided for each
claim in a parenthetical expression following each claim number. Changes to the
claims are shown by strikethrough (for deleted matter) or underlining (for added
matter).

10 Claims 1-26 were originally filed.
No claims are currently canceled.
Claims 32-41 are added.
Claims 1 and 31 are currently amended.
Accordingly, claims 1-18, 24-25 and 31-41 are pending.

15
1. (Currently thrice Amended) A method of manufacturing a slotted
substrate comprising:
forming a masking layer over a front side of a substrate;
patterning and etching the masking layer to form a hole therethrough,
20 wherein the hole exposes the substrate;
depositing a first layer over the masking layer and in the hole on the
exposed substrate;
patterning and etching the first layer to form a plug in the hole; and
etching a back side of the substrate until a bottom surface of the plug is
25 substantially exposed and a slot in the substrate is substantially formed, wherein
the plug substantially plugs up the slot, and wherein the plug substantially
defines a fluid-feed passageway extending between the slot and a firing chamber.

10007457-1

2. (Previously Amended) The method of claim 1 further comprising etching to remove the plug after etching the back side of the substrate to form the slot.

5 3. (Original) The method of claim 1 further comprising forming another masking layer over the back side of the substrate, and patterning and etching the other masking layer before etching the substrate.

10 4. (Original) The method of claim 1 wherein the substrate is etched with at least one of TMAH, KOH, and other alkaline etchants.

15 5. (Original) The method of claim 1 further comprising forming a recess in the substrate corresponding with the hole in the masking layer, wherein the plug extends into the recess.

6. (Original) The method of claim 1 wherein the first layer is at least one of silicon dioxide, silane-based silicon dioxide, silicon nitride, field oxide, silicon carbide, silicon oxynitride and TEOS.

20 7. (Original) The method of claim 1 further comprising etching an interface of the substrate and the first layer along the bottom surface of the plug at a first rate; and etching an interface of the substrate and the masking layer at a second rate that is slower than the first rate.

25 8. (Original) The method of claim 1 further comprising substantially etching an interface of the substrate and the first layer along the bottom surface of the plug in the etching of the substrate slot.

10007457-1

9. (Original) The method of claim 1 further comprising defining dimensions of an opening in the front side of the substrate by utilizing the plug, wherein dimensions of the plug substantially correspond to the dimensions of the opening.

5

10. (Original) The method of claim 1 further comprising utilizing the plug to align the trench to the hole etched into the masking layer on the front side of the substrate.

10 11. (Previously Twice Amended) A method of manufacturing a fluid ejection device comprising:

forming a masking layer over a first surface of a substrate;

patterning and etching the masking layer to form a hole therethrough, wherein the hole exposes the substrate;

15 depositing a first layer over the masking layer and in the hole on the exposed substrate;

patterning and etching the first layer to form a plug in the hole; and

etching a second surface opposite the first surface of the substrate until a bottom surface of the plug is substantially exposed and a slot in the substrate is
20 substantially formed, wherein the plug substantially plugs up the slot.

12. (Original) The method of claim 11 further comprising etching to remove the plug after etching the substrate to substantially form the slot through the substrate.

25

13. (Original) The method of claim 11 further comprising depositing a thin film stack including a fluid ejector over the first surface of the substrate and under the masking layer.

10007457-1

14. (Original) The method of claim 12 further comprising depositing a thin film stack including a fluid ejector over the first surface of the substrate.

5 15. (Original) The method of claim 14 wherein there are multiple plugs in the front side of the substrate, the method further comprising defining a firing chamber formed over the thin film stack and defining a plurality of holes through the substrate after removing the plug, wherein at least two of the holes feed into the firing chamber.

10 16. (Original) The method of claim 11 wherein the slot is etched with at least one of TMAH, KOH, and other alkaline etchants.

15 17. (Original) The method of claim 11 wherein the slot has a first wall section adjacent the plug, and a second wall section adjacent the second surface, wherein the first wall section extends from the plug adjacent edges of the plug towards the second surface, and the second wall section is shaped substantially as a truncated pyramid and couples with the first wall section.

20 18. (Original) The method of claim 11 wherein the slot has a first wall section adjacent the first surface, a second wall section, and a third wall section adjacent the second surface, wherein the second wall section is in between the first and third wall sections, wherein the first and third wall sections are shaped substantially as truncated pyramids, and the second wall section has walls that couple the truncated pyramids.

25

19. (Withdrawn) A slotted substrate comprising:
a substrate having a first surface, a second opposite surface, and a slot extending from the second surface towards the first surface;

10007457-1

a masking layer formed over the first surface, the masking layer having a hole therethrough corresponding to the slot; and

a plug formed into the hole of the masking layer and having a bottom surface that is substantially exposed in the slot.

5

20. (Withdrawn) The slotted substrate of claim 19 wherein the slot has a first wall section adjacent the plug, and a second wall section adjacent the second surface, wherein the first wall section extends from the plug adjacent edges of the plug towards the second surface, and the second wall section is
10 shaped substantially as a truncated pyramid and couples with the first wall section.

21. (Withdrawn) The slotted substrate of claim 19 wherein the slot has a first wall section adjacent the first surface, a second wall section and a third
15 wall section adjacent the second surface, wherein the second wall section is in between the first and third wall sections, wherein the first and third wall sections are shaped substantially as truncated pyramids, and the second wall section has walls that couple the truncated pyramids.

20 22. (Withdrawn) The slotted substrate of claim 19 wherein the plug is composed of at least one of silicon dioxide, silane-based silicon dioxide, silicon nitride, field oxide, silicon carbide, silicon oxynitride and TEOS.

23. (Withdrawn) The slotted substrate of claim 19 wherein the first
25 surface has a recess, wherein the plug is formed into the recess, and the recess couples the hole and the slot.

24. (Previously Twice Amended) A process comprising:
forming a first masking layer over a front side of a silicon substrate;

10007457-1

patterning and etching the first masking layer to form a hole therethrough, wherein the hole exposes the substrate;

depositing a front side protection layer over the first masking layer and in the hole on the exposed substrate;

5 patterning and etching the front side protection layer over the hole;

forming a second masking layer over the back side of the substrate;

patterning and etching the second masking layer;

etching a back side of the substrate with an alkaline etchant until a bottom surface of the front side protection layer in the hole is substantially exposed and a

10 slot in the substrate is substantially formed; and

etching with a buffered oxide etch to remove the front side protection layer after etching the back side of the substrate to form the slot through the substrate, wherein the plug substantially plugs up the slot.

15 25. (Original) The process of claim 24 wherein a material for the front side protection layer includes at least one of silicon dioxide, silane-based silicon dioxide, silicon nitride, field oxide, silicon carbide, silicon oxynitride and TEOS.

20 26. (Original) The process of claim 24 further comprising substantially etching an interface of the substrate and the front side protection layer along the bottom surface of the protection layer in the etching of the substrate slot, wherein an etch rate along the interface is at least twice an etch rate of the substrate before the front side protection layer is exposed.

25 27. (Withdrawn) A slotted substrate comprising:

a substrate having a first surface, a second opposite surface, and a slot extending from the second surface towards the first surface;

a masking layer formed over the first surface, the masking layer having a hole therethrough corresponding to the slot; and

10007457-1

wherein the slot has a first wall section adjacent the plug, and a second wall section adjacent the second surface, wherein the first wall section extends from the hole adjacent edges of the hole towards the second surface, and the second wall section is shaped substantially as a truncated pyramid and couples
5 with the first wall section.

28. (Withdrawn) A medical device manufactured by the method of claim 1.

10 29. (Withdrawn) A fuel cell manufactured by the method of claim 1.

30. (Withdrawn) An optical switching device manufactured by the method of claim 1.

15 31. (Currently Amended) A method of manufacturing a fluid ejection device comprising:

forming a masking layer over a front side of a substrate;
patterning and etching the masking layer to form a hole therethrough;
depositing a first layer over the masking layer and in the hole and
20 physically contacting the substrate below the hole to create an interface between the substrate and the first layer;

patterning and etching the first layer to form a plug in the hole; and
etching from a back side of the substrate to an the interface of the substrate and the first layer at the plug, thereby substantially forming a fluid slot
25 in the substrate with the plug substantially plugging up the slot.

32. (New) A substrate slotting method comprising:
forming a masking layer over a front surface of a substrate;
patterning and etching the masking layer to form a hole therethrough;

10007457-1

depositing a first layer over the masking layer and in the hole;
patterning and etching the first layer to form a plug in the hole; and,
etching a back side of the substrate to remove substrate material until a
bottom surface of the plug is substantially exposed and a slot in the substrate is
5 substantially formed wherein the plug affects the relative position of the slot at
the front surface.

33. (New) The method of claim 32, wherein said act of patterning and
etching the first layer to form a plug comprises patterning and etching the first
10 layer to form a plug that substantially defines a fluid-feed passageway configured
to fluidly couple the slot and a firing chamber.

34. (New) The method of claim 32, wherein said act of etching forms
the slot having dimensions at the first surface that substantially match the first
15 area.

35. (New) The method of claim 32, wherein said act of patterning and
etching the masking layer exposes portions of the first surface of the substrate
and wherein said depositing comprises depositing the first layer, at least a portion
20 of which, directly contacts the first surface of the substrate and wherein substrate
material defining the first surface and contacting the first layer etches faster than
other portions of the substrate material defining the first surface but not
contacting the first layer.

25 36. (New) The method of claim 32, wherein said act of etching a back
side of the substrate comprises etching the back side of the substrate and
removing substrate material sequentially in a direction extending generally
toward the first surface until a bottom surface of the plug is exposed and then

10007457-1

etching generally laterally to form the slot respectively aligned at the first surface with the plug

37. (New) A substrate slotting method comprising:
- 5 contacting a first area of a first surface of a substrate with a first material;
 contacting a second different area of the first surface of the substrate with
 a second different material; and,
 removing substrate material from the substrate to form a slot in the
 substrate that is substantially defined at the first surface by the first area.

10

38. (New) The method of claim 37, wherein said act of removing
comprises etching, and wherein a first interface between the first material and
the first surface has a first relatively fast etch rate, and wherein a second
interface between the second different material and the first surface has a
15 second relatively slow etch rate.

39. (New) The method of claim 38, wherein said act of etching
removes substrate material generally sequentially from a second substrate
surface toward the first substrate surface.

20

40. (New) The method of claim 38, wherein said act of etching
removes substrate material laterally at a first relatively slow rate until reaching
the first interface and then the act of etching removes substrate material laterally
at a second relatively fast rate until reaching the second interface.

25

41. (New) The method of claim 38, wherein said act of etching is
affected by the first etch rate and the second etch rate to automatically center the
slot at the first surface on the first area.